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titative determination of compound proteins in tissues.

Determination of Acetanilide in Headache Powders: ATHERTON SEIDELL.

The method consists in boiling the weighed sample of powder with 20 per cent. or stronger hydrochloric acid for about five minutes, by which treatment the acetanilide is converted into aniline hydrochloride. On titrating the hot or cooled solution containing a large excess of acid with standard potassium bromate solution a flocculent precipitate of aniline tribromide separates and as soon as an excess of the bromate solution is added the yellow color of the liberated bromine indicates the end of the reaction. Experiments showed that such substances as caffeine, salol, inorganic salts, etc., do not interfere with the accuracy of the titration, but that the presence of phenacetine or of antipyrine renders the method inapplicable.

Most of the papers presented at the meetings will be published later in the different chemical journals.

The meetings were well attended, and owed much of their success to the trustees and faculty of Columbia University. A unanimous vote of thanks was tendered to them and the Chemists' Club, to the College of the City of New York and to the different industrial establishments which the visiting chemists had been invited to inspect.

This report has been transmitted through Professor Charles L. Parsons, Secretary of Section C.

C. E. WATERS,
Press Secretary.

SCIENTIFIC BOOKS

Inheritance in Poultry. By C. B. DAVENPORT, Director of Station for Experimental Evolution. Publications of the Carnegie Institution of Washington. No. 52, 1906.

The important and extensive series of experiments with poultry, carried out by Bate-

son and Saunders and Hurst in England have shown the general application of Mendelian principles to inheritance in this group. These authors have demonstrated the relation of dominance and recession of many of the characters of poultry, showing, for example, the dominance of rose comb, white plumage, extra toe, feathered shanks, white and blue shanks, crested head, brown egg color, and broodiness; and the recession of leaf comb, single comb, black plumage, buff plumage, normal foot, clear shanks, uncrested head, white egg color, and non-broodiness. The same investigators have likewise shown that Mendelian splitting occurs in the second generation, and have referred the results to Mendel's hypothesis of segregation in the gametes of the first generation of hybrids. They have also drawn attention to the fact that the dominance of characters in poultry is not always complete in the first generation. Hurst estimated, in fact, that incomplete dominance is twice as numerous as complete dominance. It was also observed that in the second generation there is often a mixing of the characters, so that it is difficult or impossible to distinguish the pure forms from the 'dominant-recessives.' In other words, there may be almost a continuous series in this generation. Such results are difficult to account for on the basis of 'pure' gametes, although a tendency towards segregation may be distinctly recognized. The case most difficult to explain in this connection is the inheritance of extra toes. Castle's recent experiments with polydactylism in guinea pigs have shown in fact that prepotency, rather than Mendelism, is a more important factor in this kind of inheritance. It looks as though certain individuals may transmit a given peculiarity differently from other individuals; and while the 'lump-sum' may often give an approximation to Mendelian expectation, the really important fact is not the chance result, but the prepotency of certain individuals in regard to the transmission of characters.

Professor Davenport's work covers in part the same ground as that of Bateson and his co-workers; in part, however, he has studied different characters and races, and has been

able to add many new and important facts to those already known. The present work is, however, to be looked upon rather as preliminary—a first instalment of the extensive experiments under way at Cold Spring Harbor.

It would seem that studies dealing with the hybridization of unit-characters relate to the field of heredity rather than to that of evolution. In fact, many evolutionists of the old school deny the applicability of such results to the theory of evolution. There seems to be here a difference of opinion, whether well founded or not the future will decide. The opening paragraph of Professor Davenport's paper leaves, however, no room for doubt as to his attitude in the matter. "Evolution proceeds by steps. These steps are measured by the characters of organisms. * * * Since the character is the unit of evolution it deserves careful study."

The paper before us consists of thirteen studies in hybridization with thirteen different races of fowls. The facts are presented with admirable clearness and conciseness, and despite the large number of details that the subject demands the matter is handled in a very attractive way. The seventeen plates of photographs add materially to the interest and importance of the work.

For the detailed results of the author's experiments, the original paper should be consulted. It must suffice here to give a few of the more salient points.

When the single-comb, black Minorca is crossed with the single comb black Polish fowl "no characteristic [character?] is inherited in strictly Mendelian fashion, for, in no case is dominance complete." In the second generation twenty-four individuals were wholly black, and twenty-five wholly black and white or mosaics. "I interpret this irregular result to be due to the imperfect dominance of black."

When the single-comb, white Leghorn was crossed with the Houdan, the offspring were white with traces of black on one or more feathers. When inbred, these hybrids produced 18 per cent. pigmented individuals like the Houdan,—the Mendelian expectation being 25 per cent.—and the rest of the offspring

was in part pure white and in part impure white. The former proved to be all males and the latter females! Other characters also, nostrils, muff, beard, crest, polydactylism, etc., show the influence of both parents in the first generation, and incomplete dominance and recession in the second, although a tendency to separate into Mendelian groups may be detected.

In the next cross, Houdan by Minorca, the author states: 'Striking is the nearly universal imperfection of dominance.' Imperfect dominance is also recorded for many characters of the five crosses that are next described, but since the experiments were carried only to the first generation, the results are still too incomplete for satisfactory interpretation.

An interesting cross was made between the Japanese Tosa fowl and the white Cochin bantam; the former race is characterized by abnormally long tail coverts. The first hybrids were like the Tosa fowl, although the tail was intermediate; every feather of the male was barred with white and in the female the shafting was broadened. In the second generation 28.1 per cent. were white to 71.9 per cent. pigmented individuals, but of the sixteen white individuals only five were without reddish pigment. "The forty-one pigmented individuals show a curiously mixed lot of coloration." One showed a Partridge Cochin plumage which must have 'lain latent in the white Cochin.' It is important to notice that in this cross white is not dominant in the first generation as with most other races of fowls.

The following four crosses were carried through the first generation only. They show, nevertheless, the complete dominance of frizzling; the incomplete dominance of the white of the white Leghorn over red of the game; the complete dominance of long tail over rumplessness (although one chick had no tail!); incomplete dominance of the black of the Cochin bantam over the red of the game.

A clear and able summary and discussion follows the detailed account of the experiments. Unit characters are not regarded as rigid or immutable from the evidences of

hybridization in poultry. DeVries's distinction between varietal and specific crosses, based on their behavior in inheritance, does not hold, as is shown by contrasting the behavior of those characters that are new to the race with those that have been lost. Furthermore a similar comparison shows that DeVries's view, that a patent character dominates a latent one, as color does albinism, is not always found to hold in poultry. Standfuss's idea, that older characters or species dominate, has been shown by Bateson and Saunders not to hold good, and Davenport is able to confirm their conclusion. Of nineteen characters examined nine old ones dominated and ten new ones. The result depends clearly on some physiological peculiarity of the character that has no relation to its antiquity. These and other conclusions of the author are of importance for a fuller understanding of the laws of inheritance.

This admirable study of Professor Davenport's gives promise of still more important work to follow when the history of the material is further worked out. The Carnegie Institution is to be congratulated on the high order of work accomplished under its auspices.

T. H. MORGAN

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SOCIETIES AND ACADEMIES

THE PHILOSOPHICAL SOCIETY OF WASHINGTON

THE 629th meeting was held on February 16, 1907, President Hayford in the chair. The evening was devoted to a paper by Dr. C. G. Abbot, on 'Solar Radiation and Terrestrial Temperature.'

The speaker gave a general account of the work of the Smithsonian Astrophysical Observatory in recent years, including its two expeditions of 1905-1906 to Mt. Wilson. The means of observing solar radiation both in total, and for all parts of its spectrum, were briefly described, and bolographic spectrum energy curves extending from wave-length 0.37μ to 2.8μ were exhibited. Such curves are obtained in twelve minutes each, and a series of eight or ten, covering the hours from low to high sun, is secured on each favorable day. By means of the expression

$\log d = m \log a + \log d_0$ (in which d and d_0 are ordinates of such curves for a given wave-length at the earth's surface and outside the atmosphere, respectively, m , is secant of the sun's zenith distance, and a the transmission of the atmosphere for zenith sun) the form of the spectrum energy curve outside the atmosphere is obtained. By means of diagrams it was shown how closely this straight line equation fits the observations, and further evidence of the trustworthiness of the formula as a means of estimating the transmission of solar radiation in the atmosphere is furnished by the close agreement of simultaneous Washington and Mt. Wilson determinations of the solar constant, though a mile difference of altitude and 3,000 miles difference of longitude is between the stations.

About sixty values of the 'Solar Constant of Radiation,' as determined by Mt. Wilson observations of 1905, were shown in a diagram, and the evident change of nearly eight per cent. in August, 1905, pointed out. It was stated that single determinations were thought to be accurate, relatively, to one per cent. for usually good Mt. Wilson days.

The average numerical value of the solar constant is believed to be 2.12 calories per square centimeter per minute; and high values obtained by Langley, Ångström, and others, as quoted in text-books, can be shown to be ill founded. Ångström, indeed, has himself withdrawn his value four calories, but it still continues to be quoted.

Observations of the reflecting power of clouds were described and preliminary results showing wide departure of clouds from ideal matt surfaces were presented. Attention was drawn to the very large amount of solar radiation lost by reflection of clouds to space, and the probability that variations of cloudiness may in many instances mask the effect of variations of the solar radiation. Inland stations, only, seem likely to yield trustworthy evidence of direct connection between variations of the solar constant and the terrestrial temperatures, but evidence was cited of a direct connection of the kind as shown in Mr. Langley's paper (*Astrophysical Journal*, June, 1904) where nearly one hundred stations over